

PCT

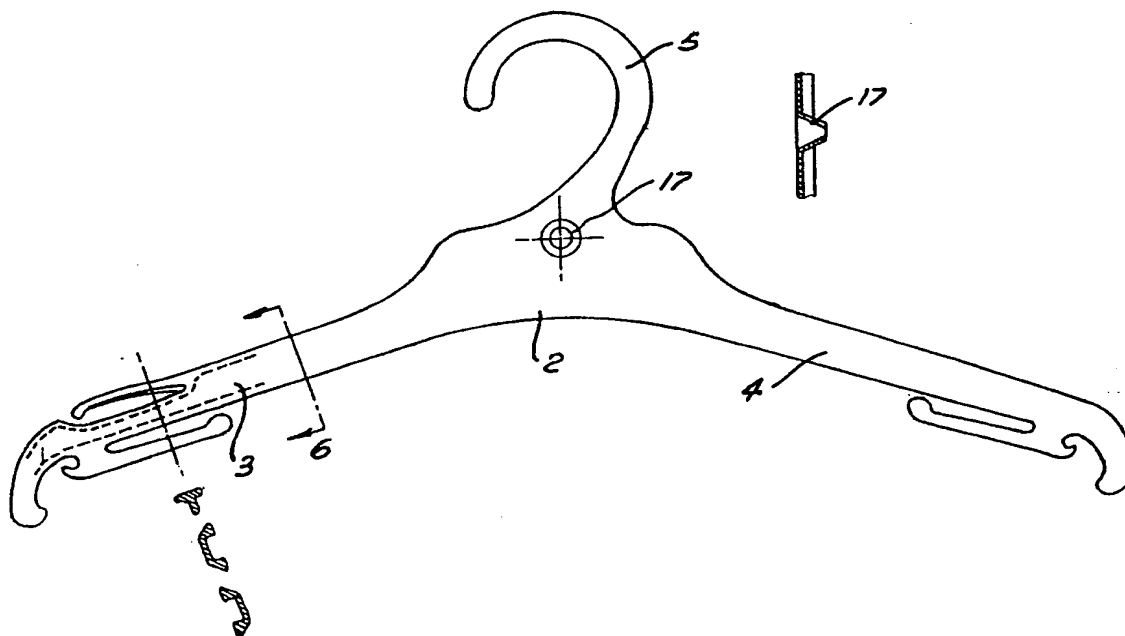
WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>4</sup> :  A47G 25/34	A1	(11) International Publication Number: <b>WO 89/10718</b>  (43) International Publication Date: 16 November 1989 (16.11.89)
<p>(21) International Application Number: PCT/AU89/00204</p> <p>(22) International Filing Date: 12 May 1989 (12.05.89)</p> <p>(30) Priority data: PI 8226 13 May 1988 (13.05.88) AU</p> <p>(71) Applicant (for all designated States except US): ROFULE PTY. LTD. [AU/AU]; 49 Marine Parade, Avalon, NSW 2107 (AU).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only) : HAZENVELD, Martin, G. [NL/AU]; 49 Marine Parade, Avalon, NSW 2107 (AU).</p> <p>(74) Agent: SHELSTON WATERS; 55 Clarence Street, Sydney, NSW 2000 (AU).</p> <p>(81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent),</p>		<p>NL (European patent), SE (European patent), US.</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>

(54) Title: GARMENT HANGER



(57) Abstract

This invention relates to garment hangers, and in particular to light-weight garment hangers moulded from plastics material. The garment hanger typically has a central portion from which the hanger is, in use hung and also has arms extending either side of the central portion. In the invention the arms have a generally "C"-shaped cross-section wherein the distal end of each of the arms of the "C" is more massive than the respective proximal ends.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	ML	Mali
AU	Australia	FR	France	MR	Mauritania
BB	Barbados	GA	Gabon	MW	Malawi
BE	Belgium	GB	United Kingdom	NL	Netherlands
BF	Burkina Fasso	HU	Hungary	NO	Norway
BG	Bulgaria	IT	Italy	RO	Romania
BJ	Benin	JP	Japan	SD	Sudan
BR	Brazil	KP	Democratic People's Republic of Korea	SE	Sweden
CF	Central African Republic			SN	Senegal
CG	Congo	KR	Republic of Korea	SU	Soviet Union
CH	Switzerland	LI	Liechtenstein	TD	Chad
CM	Cameroon	LK	Sri Lanka	TG	Togo
DE	Germany, Federal Republic of	LJ	Luxembourg	US	United States of America
DK	Denmark	MC	Monaco		
ES	Spain	MG	Madagascar		

TITLE: "GARMENT HANGER"

TECHNICAL FIELD

This invention relates to garment hangers, and in particular to light-weight garment hangers moulded from plastics material.

BACKGROUND ART

Light-weight moulded plastics garment hangers are commonly used in the retail industry for display purposes, since they are cheap to manufacture and easy to handle. It is desirable to make the garment hangers as narrow as possible in order to save space and consequently reduce transport and storage costs. In addition, in order to save raw materials, the garment hangers are commonly not made in solid section but are channelled for instance to form an I-beam profile. Hangers made in this section range from 7.5 to 10 mm across commensurate with having the strength required to resist lateral and vertical deflection when supporting a garment.

- 2 -

When flexed laterally, one side of the hanger is compressed and the other side extended. Typically the stress associated with compression and extension varies linearly across the profile, and at one point the profile is neither extended nor compressed and consequently is not stressed; the vertical plane passing through this point is referred to as the vertical neutral bending axis. Similarly, a horizontal neutral bending axis associated with vertical deflection of the hanger arms can be defined.

Several other sections are known and commonly used in the hanger industry, for instance the "T"-section the "I"-section and the "C"-section.

The known "C"-section hanger has a substantially vertical web offset to one side, but very close to, the vertical neutral bending axis. It also has substantially horizontal flanges extending from the top and bottom of the web through the neutral bending axis and beyond. The neutral bending axis being much closer to the web side of the "C" than the open side.

This arrangement suffers from the disadvantage that lateral bending causes a high concentration of stress at the distal ends of the flanges where the extension and compression is greatest. A corollary of this non-uniform concentration of stress across the "C"-section is that the hangers tend to bend sideways under load.

- 3 -

In conventional plastics moulding practice a constant thickness of material is required throughout the profile. The reason for this is that different thicknesses cool at different rates giving rise to temperature gradients which usually result in internal stresses in the solidified structure bending the profile sideways. However, as a result of having a constant thickness, the "C"-section suffers from the manufacturing drawback that, in order to produce the thin walls of the section, high pressure is required to fill the mould. Moreover the part cooling during the injection process and the very rapid cooling after injection also cause a build-up of internal stress in the material, and this is maximised at the ends of the arms of the "C". This stress can cause micro-cracks to appear which increase the chances of breakage during normal use.

#### DISCLOSURE OF THE INVENTION

According to the present invention there is provided a garment hanger having a central portion from which the hanger is, in use, hung and arms extending either side of the central portion; the arms having a generally "C"-shaped cross-section wherein the distal end of each of the arms of the "C" is more massive than the respective proximal end.

- 4 -

Preferably, the distal ends of the arms of the "C" are relatively larger than the proximal ends.

In preferred embodiments the "C"-shape comprises a vertical web from the top of which extends an upper generally horizontal arm, and from the bottom of which extends a lower generally horizontal arm; wherein the thickness of the horizontal arms increases as they extend away from the web. This increase may be linear or curved in a convex or concave fashion. Preferably the additional thickness is added to the outer sides of the flanges so that it does not obstruct the opening of the "C", since this would create problems in opening and closing the mould cavity.

In an alternative arrangement the thickness of the arms increases in a stepwise fashion. In this case it is preferred that a first flange extends upward from the distal end of the upper arm of the "C" and a second flange extends downward from the distal end of the lower arm of the "C"; the flanges being essentially vertical over their entire length and not being connected to further flanges or webs.

The sum of the masses of the first and second flanges is preferably equal to the mass of the web of the "C", and the height of each flange is preferably equal to half the height of the web of the "C".

Hangers embodying the present invention have a section which is stronger than a simple "C"-section of

the same thickness, i.e. of the same arm length of the "C". Alternatively the hangers may be made slimmer with the same strength, and any reduction of the thickness of the hangers reduces costs for packaging, storage, transport and display at point of sale.

Hangers embodying the present invention also have a cosmetic advantage, particularly since when viewed from the web side of the "C" the impression given is that of a solid hanger, if it is made of opaque material. If transparent material is used the effect is more attractive than that produced by more complicated profiles since it has cleaner lines and there is less distortion of the light transmitted through the profile. Even when viewed from the open side of the "C" the uncluttered styling gives the hanger a pleasing appearance.

Since hangers embodying the invention have a section which has more material concentrated in the distal ends of the arms of the "C" the neutral bending axis is moved away from the web and towards the distal ends of the arms of the "C" which consequently endure less deformation during lateral bending. As a result the stress in the material at the distal ends of the arms of the "C" is greatly reduced. It follows that the section embodying the invention is less prone to breakage during normal use.

- 6 -

The profile of the hanger is preferably constructed such that the vertical neutral bending axis is equidistant from the front and the back of the "C".

Hangers embodying the invention also have the advantage that when they are injection moulded the increased thickness of the profile ends allows a lower pressure fill, which in turn results in less stress being built into the material.

It is also possible to fabricate hangers having a section embodying the invention from a material having a lower than conventional melt flow, because of the easier flow during injection. Many materials with a low melt flow withstand more elongation before breaking which confers greater flexibility on the finished product. Some other materials are only available with a low melt flow and can therefore not be used to make hangers having more complicated profiles.

Reduced injection pressure also allows smaller machines (less locking force) to be used. Furthermore the simple profile simplifies production of the mould because the cavity in the mould can be cut with bigger cutters.

The problems of build-up of internal stress due to a non-constant thickness in the profile may be overcome by using state of the art plastics with extremely low or no shrinkage which therefore do not suffer from bending after moulding. Other ways of mitigating this problem



include the use of one or more flanges extending from the web of the "C" between the arms; making the web thinner so that it cools rapidly and retains its shape; and including fins on the thick parts of the profile, especially at the distal ends of the arms of the "C" when these are thick.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described by way of example only with reference to the accompanying drawings in which:

figure 1 shows a view of the 'facing' side of a typical mens hanger which may embody profiles according to the invention;

figure 2 shows a view of the "facing" side of a typical womens hanger which may embody profiles according to the invention;

figure 3a shows a preferred form "C"-section embodying the present invention;

figure 3b shows a second "C"-section embodying the present invention;

figure 3c shows a third "C"-section embodying the present invention;

figure 3d shows a fourth "C"-section embodying the present invention; and

figure 3e shows an "S"-section embodying the present invention.

- 8 -

Referring now to figures 1 and 2 a typical hanger 1 has a central portion 2 from which extend two arms 3 and 4.

#### BEST MODES FOR CARRYING OUT THE INVENTION

The distal ends of the arms may be toothed or finished in any other convenient way depending upon the garment to be hung. The arms of the hanger may also include clips, slots and/or any other garment attachment means desired. For instance, the arms may include outwardly facing hooks slung underneath the arms to hang skirts. Also inwardly facing extensions are useful to capture the strap of garments. Outwardly facing portions above the arm may be used to engage the shoulder pads of dresses etc. All these portions of the hanger may share the same profile or may have different profiles as indicated on figure 2.

A hook 5 may be moulded as a unitary part of the hanger in order to hang the hanger conveniently on a rail. However, the hook may be omitted from the plastics construction in which case it may be manufactured separately and subsequently attached to the hanger, for instance a wire hook may be attached to the hanger later, or, a hook may be permanently attached to the rail and releasably attached to the hanger in any convenient manner as required.

The longitudinal section of the garment hanger, seen for instance along section line 6 is the concern of the present invention, and the form of the other parts of the hanger are optional.

The section embodying the invention comprises a substantially vertical web 7 from which extend an upper and lower arms 8 and 9 respectively. The distal ends of arms 8 and 9, that is 10 and 11, are enlarged with respect to the proximal ends. The enlargement preferably occurs on the outside of the "C" so that the aperture 12 is not constricted, which would make moulding more difficult. Preferably the sum of the masses of the enlargements 10 and 11 at the ends of the arms is greater than or equal to the mass of the web 7. The enlargements 10 and 11, of the ends of the arms, move the vertical neutral bending axis 13 away from the web, preferably to a central position in the "C". In this way the stress generated at the distal ends of the arms is reduced, and the section itself is generally better balanced.

Figure 3b shows an alternative section which also embodies the present invention. This section also comprises a substantially vertical web 7 having upper and lower arms 8 and 9. A substantially vertical flange 14 extends up from the distal end of horizontal arm 8, and a second substantially vertical flange 15 extends down from the distal end of arm 9. It is important that

- 10 -

no further flanges are attached to flanges 14 and 15 since these would complicate the structure and make it more difficult to manufacture, reduce its cosmetic appeal, and make it more prone to breakage.

In the profile shown in figure 3b the vertical neutral bending axis 13 is again moved to a central position in the "C". The centre of gravity in both the embodiments described so far is also moved to a position substantially on the neutral bending axis, which improves the balance of the completed hanger. Preferably the sum of the masses of flanges 14 and 15 is equal to the mass of the web 7.

The combined height of the flanges 14 and 15 is also preferably equal to the height of web 7.

The same profile may run all along the arms of the hanger from end to end and through the central portion 2. Alternatively the section may vary along the length of the arms of the hanger, and there may be a mix of sections.

An alternative way of manufacturing the hanger embodying the invention, which is not preferred, would be to include a more massive material insert in the distal ends of the arms of the "C".

It should be noted that the exact configuration of the vertical web 7 is unimportant and it need not necessarily be straight, for instance it could be thicker at one place than another or channelled. Web 7

- 11 -

may even be folded into a "C"- section if required. In this case it may extend up to and include the neutral bending axis. As shown for instance in figures 3c and 3d.

It should also be appreciated that the present invention may be applied to other profiles, for instance an "S"-shaped section having increased mass located at the distal ends of the "S" as shown for instance in figure 3e.

The profile need not be continuous along the length of the hanger and webs may extend across and fill the cavity 12 from time to time along the arms, these webs may be vertical or offset from the vertical as required in order to contribute the required strength to the structure.

The profile may also vary along the length of the arms, for instance from a section as shown in 3a to a section as shown in 3d. Similarly the section of the region 16 in figure 1 may be similar to that of central region 2, or may be different, for instance it may be desirable to have one section in region 2 and a reverse section in region 16.

A further advantageous feature of profiles embodying the present invention is that sections of different sizes are able to fit within and slide along each other which provides the opportunity to make a very slim expandable hanger for waisted garments.

- 12 -

In the central portion 2 an open-ended frusto-conical extension 17 is useful to interlock with other hangers when they are stacked together. This also ensures a straight path for a tie through the bundle. Of course, it should be appreciated that the extension 17 need not be frusto-conical in shape and could be any convenient tapering shape.

Further features and embodiments of the invention will be immediately apparent to the man skilled in the art of hangers.

## CLAIMS:-

1. A garment hanger having a central portion from which the hanger is, in use, hung and arms extending either side of the central portion; the arms having a generally "C"-shaped cross-section wherein the distal end of each of the arms of the "C" is more massive than the respective proximal end.
2. A garment hanger as claimed in Claim 1 wherein the distal ends of the arms of the "C" are relatively larger than the proximal ends.
3. A garment hanger as claimed in Claim 1 wherein the "C"-shape comprises a vertical web from the top of which extends an upper generally horizontal arm, and from the bottom of which extends a lower generally horizontal arm; and wherein the thickness of the horizontal arms increases as they extend away from the web.
4. A garment hanger as claimed in Claim 3 wherein the increase in thickness of the arms is either linear or curved in a convex or concave fashion.
5. A garment hanger as claimed in Claim 4 wherein fins are included on the distal ends of the arms of the "C".
6. A garment hanger as claimed in Claim 3 wherein the increase in thickness of the arms is stepwise.
7. A garment hanger as claimed in Claim 6 wherein the cross-section comprises a first flange extending generally vertically upward from the distal end of the upper arm of the "C" and a second flange extending

generally vertically downwards from the distal end of the lower arm of the "C".

8. A garment hanger as claimed in Claim 7 wherein the sum of the masses of the first and second flanges is equal to the mass of the web of the "C".

9. A garment hanger as claimed in Claim 7 or Claim 8 wherein the height of each flange is equal to half the height of the web of the "C".

10. A garment hanger as claimed in any preceding claim wherein the profile of the garment hanger is constructed such that the vertical neutral bending axis is equidistant from the front and the back of the "C".

11. A garment hanger substantially as hereinbefore described with reference to the accompanying drawings.



- 1 / 3 -

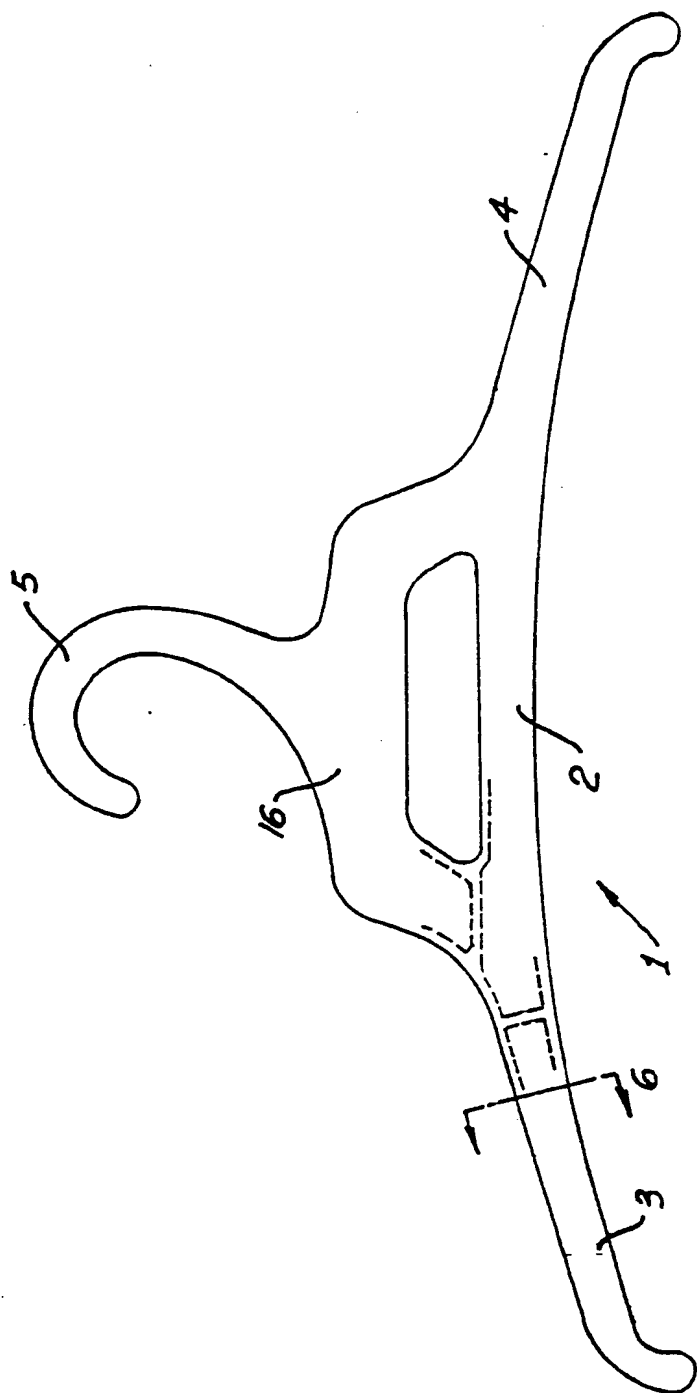
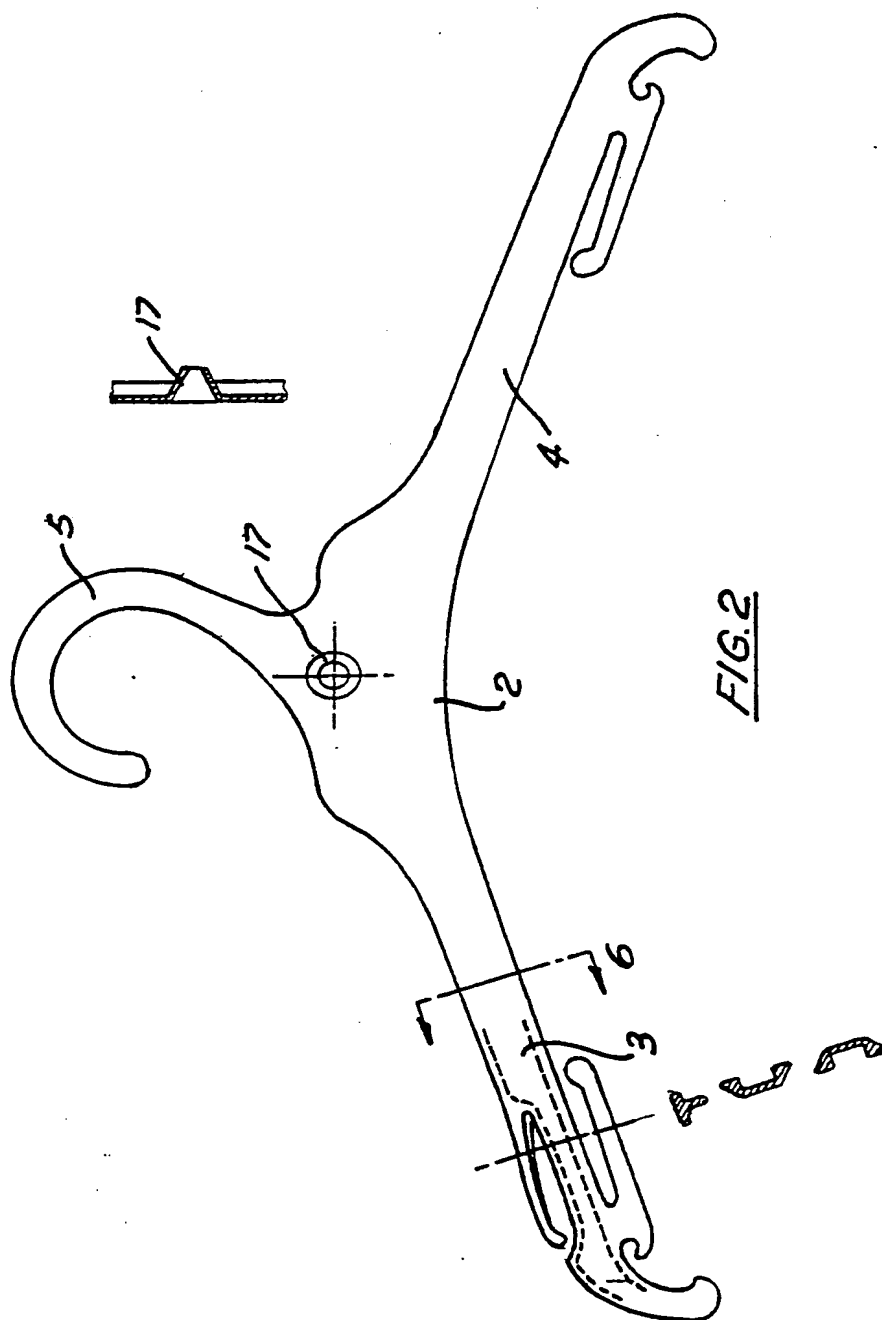


FIG. 1



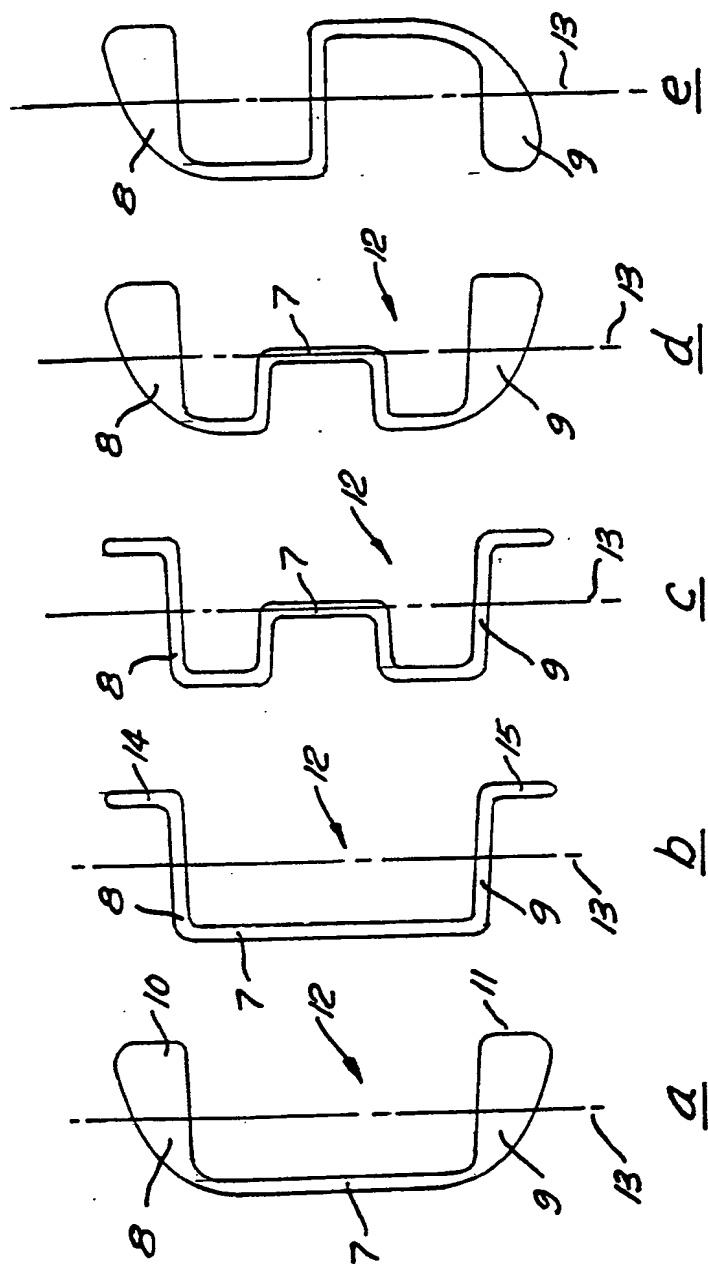


FIG. 3

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 89/00204

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) 6				
According to International Patent Classification (IPC) or to both National Classification and IPC				
Int. Cl. <sup>4</sup> A47G 25/34				
<b>II. FIELDS SEARCHED</b>				
Minimum Documentation Searched 7				
Classification System	Classification Symbols			
IPC	A47G 25/34, A47J 51/096			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8				
AU: IPC as above				
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 9				
Category*	Citation of Document, with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13		
X	US,A,3477623 (MILETE et al) 11 November 1969 (11.11.69)	(1,2)		
X	GB,A,1174544 (JOHN THOMAS BATTIS INC) 17 December 1969 (17.12.69)	(1,2)		
Y	AU,B,59588/65 (287964) (PLASTIC ACCESSORIES PTY LTD) 16 November 1967 (16.11.67)	(1,2)		
Y	US,A,4226345 (SZABO) 7 October 1980 (07.10.80)	(1,2)		
Y	GB,A,1295554 (SHIZUYUKI SUZUKI) 8 November 1972 (08.11.72)	(1,2)		
P,Y	WO,A, 89/02238 (SPOTLESS PLASTICS PTY LTD) 23 March 1989 (23.03.89)	(1-11)		
A	GB,A,784381 (GILD) 9 October 1957 (09.10.57)	(1-11)		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;">           * Special categories of cited documents: 10            *A* document defining the general state of the art which is not considered to be of particular relevance            *E* earlier document but published on or after the international filing date            *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)            *O* document referring to an oral disclosure, use, exhibition or other means            *P* document published prior to the international filing date but later than the priority date claimed         </td> <td style="width: 50%; vertical-align: top;">           *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention            *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step            *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.            *Z* document member of the same patent family         </td> </tr> </table>			* Special categories of cited documents: 10 *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *Z* document member of the same patent family
* Special categories of cited documents: 10 *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *Z* document member of the same patent family			
<b>IV. CERTIFICATION</b>				
Date of the Actual Completion of the International Search 29 August 1989 (29.08.89)	Date of Mailing of this International Search Report <b>04 SEPTEMBER 1989</b> (04.09.89)			
International Searching Authority  Australian Patent Office	Signature of Authorized Officer DAVID BERTRAM			

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 89/00204

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

---

Patent Document  
Cited in Search  
Report

Patent Family Members

---

GB 1295554

CA 945961  
JP 50030408

DE 2157586

FR 2078190

---

WO 8902238

AU 25247/88

---

END OF ANNEX